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**„Does self-leadership affect the stress-appraisal of entrepreneurs through
increased optimism, self-efficacy and subjective vitality?“**

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Abstract

We explore the effects of self-leadership on stress-appraisal via optimism, self-efficacy and subjective vitality and its consequences for entrepreneurs. We developed a questionnaire consisting of scales that measure the degree of how start-up founder evaluate their self-leadership, optimism, self-efficacy, subjective vitality as well as stress-appraisal (challenge vs. hindrance). By using bootstrapping analysis, we found that self-leadership has a positive relationship with optimism, self-efficacy and subjective vitality. Also, findings provided support for the negative effects of optimism on the hindrance-appraisal of stressors. Our results provide evidence that entrepreneurs can benefit from self-leading, especially in the early stages of the venture-creation process.

Keywords: Entrepreneurship, Self-leadership, Stress-appraisal, Well-being

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INTRODUCTION

Potential causes of stress surround us on a daily basis. May it be stress caused by financial liabilities, personal relationships or at work. The harmful effects of stress on one's physical and mental health as well as overall well-being are very well documented and it has also been shown that high levels of stress cause exhaustion, fatigue, irritability and restless nights (Cooper & Marshall, 1976; Jex & Beehr, 1991). It is even considered to be the "health epidemic of the 21st century" by the World Health Organization (WHO), and recent estimations state that stress costs US businesses \$300 billion or \$5,000 per employee per year (Cardon & Patel, 2013, p. 379). In this context, the cognitive appraisal process of human beings plays a pivotal role, since their well-being relies on the ability to evaluate perceptions, and function as critical mediators of stressful person-environment relations (Lazarus & Folkman, 1984).

Studies have found that entrepreneurial endeavours lead to significantly higher levels of job and life satisfaction, despite of working over hours and earning lower incomes, because it uniquely facilitates the fulfilment of basic psychological needs (Shepherd and Patzelt, 2017). At the same time, there is evidence that it can lead to high levels of stress, grief, feelings of loneliness and fear, mostly due to the fact that entrepreneurship is known as an emotionally demanding and uncertain process (McMullen & Shepherd, 2006; Monsen & Wayne, 2009). Research, therefore, touches upon the lack in empirical analysis by exploring different ways that lead to an amplification of the benefits related to entrepreneurship, and a mitigation of the issues, so the overall well-being rises (Shepherd, 2015; Shir et al., 2018).

Entrepreneurs are considering to be in a complex and uncertain work environment. They are exposed to a different job demands and scarcity of financial resources, which results in higher amounts of stress (Baron, 1998; Cardon & Patel, 2013). The specific role of stress-appraisal is ambiguous, indicating that; firstly, there is evidence that perceiving stressors more as "challenges" rather than "obstacles" can have positive effects on the performance and

consequently on the well-being of individuals. And secondly, that it depends on the individual, being that some appraise the common “challenge stressors” as hindrances or challenges (González-Morales & Neves, 2015). Hence, looking at the highly stressful environment entrepreneurs are exposed to, the understanding of stress-appraisal in uncertain situations will contribute to the knowledge of the processes that influence their behavior. By examining how entrepreneurs regulate themselves in an uncertain environment and still pursue their goals or retain their passion in phases of exhaustion, practical implications can be made not only for entrepreneurs, but also for those who are working closely with them (e.g. investors) (Lopez et. al., 2018).

There is growing empirical evidence in entrepreneurial literature, that the appraisal of constraints as challenges or opportunities will determine their reactions towards it, leading to an attitude of entrepreneurial passion or fear of failure (Jiang & Tornikoski, 2018). A lack in a more sophisticated approach of cross-level modelling can be observed, when inspecting further research on entrepreneurship in particular. For instance, importing concepts from organizational behavior theory and strategic management (Hmieleski & Ensley, 2007).

In this study we explore a) if self-leadership has a positive relationship with optimism, self-efficacy and subjective vitality and b) if self-leadership has a positive relationship with challenge-appraisal and a negative relationship with obstacle-appraisal via the aforementioned attributes. By importing leadership concepts and investigating the effects self-leading behavior has on positive psychological capital such as optimism and self-efficacy, but also on subjective vitality, we try to find antecedents of challenge-appraisal. By doing that we attempt to find mechanisms that promote challenge-appraisal of stressors

The relevancy of stress-research in an entrepreneurial context

The empirical examination of Cavanaugh et. al. (2000) proposes that work stress experienced by U.S. managers is both, positively and negatively related to work outcomes, depending on “good” and “bad” stressors (Cavanaugh et. al., 2000). If that is the case for managers, it should apply even more so for entrepreneurs, factoring in that they have more health-problems and are less able to get rid of tension related to work (Harris et. al., 1999).

Aspirations of becoming involved in entrepreneurial activities are emerging and are especially reflected through Gen Z, those born between 1994 and 2010, that are “poised to become the most entrepreneurial generation we’ve ever seen” (Singh, 2014, p. 60). This is mainly due to different requirements and motivating factors compared to previous generations as well as the different setting of those who were raised in the 2000’s, growing up with internet, smartphones and free available digital media (Singh & Dangmei, 2016). However, the upcoming generation is overshadowed by the lack of comprehension and direction; where to start, what is needed and what to strive for in the journey of starting an enterprise. Specific behaviors and a course of action could provide remedy so that individuals being keen to entrepreneurial endeavours can be provided with a starting point and act along a proposed way. Strategies around self-leadership may be a promising way to overcome problems in the most fragile phase of any start-up, together with cementing entrepreneurial commitment and nourishing useful complementary skills. Especially because self-leading strategies are applicable and can be implemented into the daily life of an entrepreneur right away. A research conducted by Müller & Niessen (2019), investigate the connection between working location and self-leading behavior in part-time teleworkers that work repeatedly in a traditional office environment and at home (Müller & Niessen, 2019). Their findings related to self-leadership and working at home revealed a relationship between working location as well as self-reward, self-goal setting and imagery of successful performance through the mediating role of

autonomy (Müller & Niessen, 2019). Entrepreneurs, especially in the beginning stage of their venture, predominantly do not work in a traditional office setting and have a high degree of autonomy, therefore should also benefit from self-leading behaviour as it is the case for teleworkers. Accordingly, self-leadership applied by entrepreneurs, should lead to a higher level of work satisfaction, which affects their optimism, self-efficacy and subjective vitality.

Since the Bolton Report (1971) a huge amount of research has been dedicated to the discovery of clear characteristics and attributes that enhance the success of small businesses (Watson, Hogarth-Scott & Wilson, 1998). Here, in order to understand why certain people, want to become entrepreneurs and are more successful than others in their endeavours, a combination of three key elements need to be addressed: attributes, experience, and skills (Stanworth & Gray, 1991). Especially attributes and skills can be positively influenced by self-leading behavior through developing proactive and constructive thought-patterns. Another benefit of applying them refers to counteracting negative emotions associated to the “demarrage” phase of development (beginning stage of every start-up between launch and sustained growth, which is usually between the second and fifth year of operation), in which personal problems and feelings of loneliness arise due to the workload and financial uncertainty (Cromie, 1991). Mental visualization of positive performance in combination with positive self-talk might support the mental and physical stability of the founders. However, there is a discordancy concerning the reasons of successful small business performance and researcher. Osborne (1993), for example, states that success is not related at all to entrepreneurial competence and skills. He posits that entrepreneurial success is more dependent on underlying business concepts and managerial competencies (Watson, Hogarth-Scott, Wilson, 1998). Still, even studies that support Osborne’s point put the emphasise on the importance of one’s personal situation that does have an impact on the performance on the business. Given the fact that everyone is struggling personally at some point in their life, the question of how some

individuals are obviously better in coping with them compared to others arises. This question is highly connected to the work on stress and its appraisal that has been done not only in a business context, but also in sports and other fields of investigation (e.g. Kaiseler et. al., 2009; Prati et. al., 2010).

The concept of stress has been around for centuries but only gained attention as a scientific area of exploration in the late 1940's due to World War II and the significance of stress research in military combat (Lazarus & Folkman, 1984). Ever since a strong increase in the amount of publications on the topic can be recorded, focusing on coping processes that individuals use to deal with stressful events (Kobasa, Maddi, & Kahn, 1982; Folkman et. al., 1986). Previous analyses have focused on the sources of stress among different occupational groups like engineers, health care professionals managers and teachers, however, stress research on entrepreneurs has received little attention, despite the fact of the role it plays in world's economy (Buttner, 1992; Cavanaugh et. al., 1998).

This study aims to link the effect of self-leadership on stress-appraisal through the mediating effect of attributes such as optimism, self-efficacy and subjective vitality. Particularly, the positive impact of optimism and self-efficacy on well-being was revealed in several studies (Judge, Van Vianen & De Pater, 2004). In combination with vitality, that is dynamic in nature and is being associated to having a better mood, high spirit and enthusiasm, a promising foundation of factors has been laid for looking at attributes that may have a positive effect on stress-appraisal in an entrepreneurial context (Ryan & Fredrick, 1997).

Self-Leadership and its role in entrepreneurship

Leadership literature recently started to recognize the importance of leadership in the new venture creation process by challenging many traditional assumptions in organizational behavior and organizational psychology in order to provide a different source of view on entrepreneurship (DeRue & Ashford, 2010). Mostly, self-leadership is a promising field of investigation, where previous empirical research on the topic has examined a relationship between self-leading of employees and their performance (e.g. Bandura & Schunk, 1981; Cervone, 1989).

The term self-leadership is defined as “the process of influencing oneself to establish the self-direction and self-motivation needed to perform” (Neck & Manz, 1992, p. 682). Derived from the social cognitive literature it mainly captures “a comprehensive self-influence perspective that concerns leading oneself toward performance of naturally motivating tasks as well as managing oneself to do work that must be done but is not naturally motivating” (Manz, 1986, p.589). In particular, strategies that involve self-praising as a mental reward for an important accomplishment, taking advantage of self-created schedules or other self-cues to keep the focus on goal attainment and self-goal-setting enable people to realize unpleasant work tasks (Müller & Niessen, 2019). In organizational literature, the focus has been mainly on “self-management” that relates to regulating one’s behavior, so discrepancies between externally set standards and internal motives are reduced (Manz, 1986, p.585ff.). Notwithstanding that there are obvious similarities of those two concepts, self-leadership goes beyond reducing discrepancies and deals with “the utility of and the rationale for the standards themselves” (Neck et al., 1999, p.479). That one may benefit from self-leading, certain strategies, that facilitate a perception of having control over a situation and being responsible for the outcome have a positive impact in the outcome, need to be applied. There are three apparent types of self-leadership and consecutive outcomes: strategies that focus on behaviour, strategies that

focus on self-reward and strategies around beneficial thought-patterns (Prussia, Anderson & Manz, 1998). Behavior-focused strategies are associated to self-assessment, self-reward, and self-discipline such as identifying and applying rewards that accelerate motivation, analysing long-term goals or reducing habitual self-punishment patterns. This can be summarized as practising behaviors that are considered as desirable (Manz, 1992). Strategies that involve self-rewards include positive apprehension and experiences that go together with task-accomplishment, so that work is more enjoyable through facilitating rewards. This can be achieved by either making the activity itself more pleasurable, so the task becomes rewarding, or refocusing the attention away from unlikeable pursuits and pay particular attention to the intrinsic compensation of an individual (Manz & Neck, 2004; Manz & Sims, 2001, p. 103ff.). By triggering two primary components of intrinsic motivation, namely creating feelings of competence and self-determination, one will feel more capable and inspired by undergoing a certain duty (Deci & Ryan, 1985). Lastly, strategies that enhance constructive thought patterns are beneficial in order to influence or create desirable thought-patterns through self-analysis, enhancement of belief-systems, visualization of good performance, talking to oneself in a positive way and using clear scripts (Prussia, Anderson & Manz, 1998). A meta-analysis performed by Driskell et. al. (1994), that include 35 different studies, discovered that envisioning successful performance in advance increases the probability of a successful outcome when actually performing the task (D'Intino et al., 2007).

The reason for investigating further in the field of internal factors is twofold: Firstly, internal characteristics and attributes of founders supposedly do have an impact on the external environment under the context of triadic reciprocity¹ and secondly, a myriad of literature proposes to inquire further into the field to explore differences and reciprocal relations among

¹ It suggests that behavior, cognitions, and the external environment reciprocally influence one another such that behavior is influenced by both internal mechanisms and the external environment and vice versa (Bandura, 1986).

entrepreneurs and successful self-leadership behavior (D'Intino et. al, 2007; Neck & Houghton, 2006; Prussia, Anderson & Manz, 1998)

All of the aforementioned self-leadership strategies and developing the skills linked to them may contribute to successful entrepreneurship and can offer a solid framework of actions to founders that help in building their new ventures or nourishing growth, by influencing their behavior and attracting more funding or skilful employees that help along the way. Start-up success as well as successful entrepreneurship is a complex topic and hence relies heavily not only on external but also internal factors that have an impact on the business survival and future performance (Watson, Hogarth-Scott & Wilson, 1998). Nonetheless, no research has specifically looked onto general self-leadership behavior, their impact on optimism, vitality and subsequently stress-appraisal together with its apprehension of upcoming problems in an entrepreneurial context. For instance, D'Intino et. al. stated, that “the goal of increased self-leadership for entrepreneurs is for these individuals to more effectively lead themselves and applying specific behavioural and cognitive strategies to improve their lives and their entrepreneurial business venture” (D'Intino et. al., 2007, p.105). By examining the reciprocal relationship between self-leading and entrepreneurship, new insights can be gained that help entrepreneurs along the way. Also, they pointed at the application of self-leadership on entrepreneurship and that it would assist the self-directed nature of building and growing a business, since entrepreneurship has a social nature to it (D'Intino et. al., 2007).

In the following, the concept of self-leadership will be linked with the concepts around self-efficacy, optimism, subjective vitality and stress-appraisal, in order to understand the relationship as well as the positive associations between them. The goal is to provide evidence that self-leadership can amplify the perceived feelings related to optimism, self-efficacy and vitality, so that the positive impact they have on the well-being of an individual can be translated on the concept of stress-appraisal (Judge, Van Vianen & De Pater, 2004).

Self-Leadership and self-efficacy

The definition of self-efficacy is mainly constructed around people's beliefs relating to their capabilities, so they are able to achieve a certain levels of performance that helps in determining how they think, feel and behave. Having a strong self-efficacy can boost personal accomplishments as well as one's well-being in various ways (Bandura, 1994). Additionally, having a higher perception of self-efficacy increases the feeling of ones' confidence about success in a particular task domain (Prussia, Anderson & Manz, 1998). There are studies that have shown that self-leadership influences self-efficacy perceptions by examining individual components of self-leadership and were being able to provide evidence for an influence on self-efficacy (Prussia, Anderson & Manz, 1998). When leading oneself, Bandura and Cervone (1989) looked at the fact that individuals high in self-efficacy started to increase their efforts, whereas people low in self-efficacy did not (Bandura & Cervone, 1989). Prussia et. al. (1998), were able to support their hypothesis that "self-leadership strategies have a direct, positive effect on the level of self-efficacy" with a predicted influence of the strategies on self-efficacy perceptions (0.498, $p < 0.05$) (Prussia, Anderson & Manz, 1998, p.526). Those findings are coherent with other research that examined the mediating effects of self-efficacy (e.g. St. Jean & Mathieu, 2015), nonetheless, the sample they used amount to students in an entrepreneurship class, not "real" entrepreneurs that are exposed to different situations and might apply different self-leadership behavior. The lack in generalizability brings along the first hypothesis:

Hypothesis 1: Entrepreneur's self-leadership has a positive relationship with perceived self-efficacy.

Self-Leadership and optimism

Generally, optimists are being perceived as people who expect good things to happen to them rather than bad things (Carver, Scheier & Segerstrom, 2010). One of the first definitions on optimism was made by Lionel Tiger (1979) saying that it is “a mood or attitude associated with an expectation about the social or material future – one which the evaluator regards as socially desirable to his [or her] advantage, or for his [or her] pleasure (p.18). Further, Peterson (2000) has put the emphasize on an important implication made by Tiger, that there is no objective optimism that applies to any individual whatsoever (Peterson, 2000). The level of optimism of an individual therefore, highly depends on what the person perceives as desirable, predicated on evaluation as well as their affects and emotions. Optimism-research initially positioned optimism as part of human nature, then recognized the fluctuations between human beings, and now starts to focus on specific behaviour, that has a positive effect on the perceived degree of optimism. Main motivation behind those studies is the emerging evidence that optimism is an important predictor of well-being and is linked to the feeling of having a meaning in life (Wrosch & Scheier, 2003; Ho, Cheung & Cheung, 2010). This is why especially entrepreneurs would benefit from an optimistic view on their environment, that would help to live through tough times in the process of building a company (D’Intino et. al., 2007).

What makes optimism so relevant in entrepreneurial research is the fact that it has the possibility to mitigate negative factors that are associated with starting a new venture, such as depression, feelings of isolation and work-overload. Existing studies on whether self-leadership is positively related to optimism (e.g. Dolbier, Soderstrom & Steinhardt, 2001) were able to support the relationship. Nonetheless, there is a lack of generalizability and for the purpose of this study, those findings cannot be transferred as they are. Studies examining the role of optimism used students rather than entrepreneurs, so the knowledge of how it operates in practice is limited. Additionally, the method of measurement was subject to critics for reasons

such as the unidimensional structure of the questionnaire and low the internal consistency (Coelho et. al., 2018). That is why for this study an alternative questionnaire was being used coming up with the following hypothesis to test with:

Hypothesis 2: Entrepreneur's self-leadership has a positive relationship with optimism.

Self-Leadership and subjective vitality

Subjective vitality is described as a conscious, positive feeling of being alert, energized and experience feeling of aliveness (Ryan & Frederick, 1997; Bostic, Rubio & Hood, 2000). Past research on the topic demonstrated that vitality is associated to a better work performance due to the fostering effect of feeling energetic and alive on the work-engagement (Dubreuil, Forest & Courcy, 2014), a better mental health (Nix et. al., 1999), and better coping with stress (Tummers et. al., 2018). In the context of organizational leadership, Tummers et. al. found that leadership abilities of their respective supervisors have an influence on their vitality (Trummers et. al., 2018). Although a lot of articles touch upon the link between different leadership styles and the influence on different form of vitality (e.g. Trummers et. al., 2018; Müller, Georgianna & Roux, 2010), no research can be found that look at the effects self-leadership can have on subjective vitality. Hence, it appears useful to test if self-leadership leads to a higher vitality of entrepreneurs and further, if it reflects in their appraisal of stressors. Leading to the third hypothesis:

Hypothesis 3: Entrepreneur's self-leadership has a positive relationship with subjective vitality.

Self -Leadership and challenge/obstacle stress-appraisal

Focusing on the relationship between stressors and perceived stress, one of the first approaches of investigation was executed by Lazarus and Folkman (1984). They investigated the patterns of appraisal, which led to different stressors that were perceived as either harmful, threatful or challenging (Lazarus & Folkman 1984). All three kinds of stress-appraisal have a

different impact on the type of emotional reactions, thus showing the coexistence between stress and emotions. Findings have shown that the way a person copes with a specific stressful encounter is representative of how he or she copes with stressful situations in general as well as the relationship of coping with depression (Folkman et. al., 1986). One of the first studies in this direction has been made by Cavanaugh et. al. (2000), out of which they came up with a two-dimensional view, exporting two factors of stressors that are inherently different from each other: one factor including demands such as job scope, high workload and high responsibility (challenge stressors) and the other including demands as organizational politics, role and concerns about job security (hindrance stressors) (LePine, Podsakoff & LePine, 2005). The main distinction here is that challenge stressors are appraised as triggering positive emotions and could promote personal gain or growth, whereas hindrance stressors are associated to more negative attributes, such as the potential to impair personal growth and trigger negative emotions.

The way individuals cope with those kinds of stressors also are different, where challenge stressors promote more effort and hindrance stressors cause withdrawal from the situation, limiting one's proactive behavior (LePine, Podsakoff & LePine, 2005). In another study LePine, LePine & Jackson applied this two-dimensional concept of stressors on learners and found that "stress associated with challenges in [a] learning environment had a positive relationship with learning performance and that stress associated with [hindrance] in the learning environment had a negative relationship with learning performance" (LePine, LePine & Jackson 2004, p.2). The outcomes of the challenge-hindrance model were regarded inconsistent with a lot of other research in this field that is solely focused on personality and other individual-difference variables (Griffin & Clarke, 2010). That is why Edwards et. al. (2013) attempted an integration of theories, combining the advantages of the sociocognitive model that addresses the disparity of stress perceptions and the main advantages of the

challenge-hindrance model that addresses the discrepancy between negative and positive stressors (Edwards et. al., 2013). They state that individuals may perceive environmental stressors either as challenges when they feel that they can overcome a situation and therefore use adaptive coping strategies, or as hindrance when the opposite is the case and consequently maladaptive coping strategies are being utilized (Edwards et. al., 2013). By being able to support their hypothesis that perceived stress is higher when looking at stressors as hindrance rather than challenges, Edwards et. al. made a very important point in stress-theory, which leaves a variety of doors open for further research. Furthermore Gonzalez-Morales & Neves (2015) were able to provide evidence that even “challenge stressors” can have negative effects on an employees’ health, the commitment to work and the performance, when being perceived as impeding. At the same time “challenge stressors” can strengthen their commitment to the organization and facilitate performance. Even a combination is possible, where for the same individual a stressor is represented by both appraisals at the same time (Gonzalez-Morales & Neves, 2015). Particularly, the work of López et. al. (2018), made the link between the stress-approach and entrepreneurship by showing that opportunity-appraisal of stressors result in seeing a potential constrain as beneficial (López et. al., 2018). This enhances the self-meaning in accomplishing entrepreneurial tasks and enhances motivation.

Few articles chose the challenge-hindrance model to investigate further into the influence of several leadership styles on the stress-appraisal, such as charismatic leadership (LePine et. al., 2015) and transformational leadership (Peiro & Rodriguez, 2008), however no exploration on self-leadership in an entrepreneurial context can be found. By doing that, findings might lead to promising outcomes that help entrepreneurs to achieve a better overall well-being, better work performance and better psychological health. This can be achieved through self-leading and the mediators optimism, self-efficacy and subjective vitality, since entrepreneurs with high self-leadership feel more in control of their projects and therefore should assess the potential

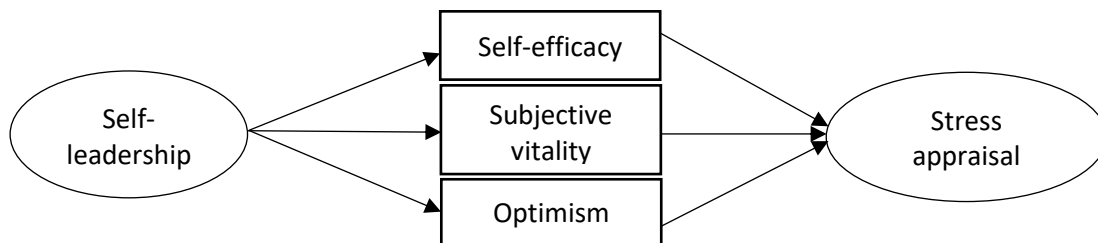
stressors more as challenges and less as obstacles. This is mainly because self-leadership promotes a positive outlook (optimism), a positive self-assessment (self-efficacy) and energizes them (subjective vitality).

Hypothesis 4: Entrepreneur’s self-leadership is positively related to challenge appraisal via a) optimism, b) self-efficacy and c) subjective vitality.

Hypthesis 5: Entrepreneur’s self-leadership is negatively related to obstacle appraisal via a) optimism, b) self-effiacy and c) subjective vitality.

MODEL

FIGURE 1. Theoretical model



METHOD

The start-ups and their founders were detected on the website CrunchBase.com, by filtering the search of tracked companies by location and funding date. The criteria for finding early-stage-ventures was restricted on companies that were founded between 2013 and 2019 in order to stay within the range of what is commonly regarded as a start-up as well as the label “active” on the website itself, to make sure that the venture is still operating. The focus was put on two main countries: Firstly, Portugal (101), mainly because of the university’s location that hosts the study, but also because of Lisbon’s reputation of being one of the biggest Hubs for start-ups in Europe. Secondly, Germany, (29) due to the affinity to the country and hence, the advantages in approaching relevant people in their mother-tongue. Nonetheless, the sample size includes founders and their Start-ups based in Finland (5), Spain (4), the Netherlands (3), Singapore (1), France (1), Italy (1), India (1), Switzerland (1) Ireland (1) and Argentina (1), too. After finding the founders and co-founders of the respective venture, we attempted to detect them on

LinkedIn. Considering the average amount of founders in a start-up (1.72) and the 1500 start-ups that were detected as a fit on CrunchBase, approximately 2900 people were invited into the network out of which 860 people accepted the invite. Subsequently, a text has been sent to all the 860 founders, with the objective of the study and the relevancy of the outcome for the founders themselves. 225 founders showed their interest, by asking for the survey-link. After providing them with the link, 146 founders filled out the survey in a correct manner, finally assembling the sample size of 146 founders (resulting in a response rate of 5.53% [total] and 26.16% [part of the LinkedIn-network]). Out of all the 152 responses, 137 (90%) were male and 15 female (10%).

Measures

The questionnaire that was sent out to the start-up-founders consists of five different scales that have been developed and used in previous studies.

Self-Leadership Scale (Houghton & Neck, 2002) describes the process that influences people's self-direction and self-motivation that is needed to perform in a desirable way. It is an eighteen-item scale with a five-point Likert type items ranging from "not at all accurate" to "completely accurate", consisting of items such as "I work towards specific goals I have set for myself". Out of the total 35 items scale, only eighteen items have been used for this study (highest loading items out of nine subdimension). The reliability coefficient was $\alpha = .81$.

Optimism Scale (Coelho et. al., 2018) is a nine item and five-point Likert-type scale ranging from "strongly agree" to "strongly disagree" consisting of items such as "When I think about the future, I am positive ". Goal of the measurement is to display the perceived degree of hope individuals pertain, that something good is going to happen in the future. Item 4 is reverse coded and is averaged with the other items. The reliability coefficient of the scale was $\alpha = .79$.

Subjective Vitality Scale (Ryan & Frederick, 1997) assesses an individual's positive feeling of aliveness and energy. It is a seven-item scale with seven-point Likert type items ranging from

“not at all true” to “very true”, consisting of items such as “I feel alive and vital”. Item two is reverse scored and is averaged with other items. The reliability coefficient of the scale was $\alpha = .82$.

Self-Efficacy (Fast et. al. 2014; Chen & Gully, 2001) assesses the perception that one can competently perform tasks and accomplish objectives. It is a four-item measure with a seven-point Likert scale ranging from “strongly disagree” to “strongly agree” consisting of items such as “I will be able to successfully overcome many challenges”. Leaving out item four the reliability was $\alpha = .725$.

Stress-appraisal (Gonzalez-Morales & Neves, 2015), is derived from LePine et. al.’s (2004) academic challenge stress items in order to generate a two-factor structure, which is based on the challenge appraisal and the threat appraisal. Similar to Gonzalez-Morales and Neves, for the sake of this study, the word obstacle was used instead of threat, since participants would recognize the concept more easily (Gonzalez-Morales & Neves, 2015). Appearing as a thirteen-item scale, the founders were instructed to rate each of the selected items in terms of how much they saw it as a challenge and as an obstacle. Including an explanation that elaborates on what an obstacle or a challenge means in relation to the development of their business (López et. al., 2018). Participants rated the two scales separately, using a scale from 1 (I am completely certain it is not an obstacle/challenge) to 5 (I am completely certain it is an obstacle/challenge), consisting of items such as evaluating the “Access to financial support” as a challenge or as an obstacle. In the further analysis, three items were left out (cultural and social norms toward entrepreneurship; current educational level and training programs provided; required policies) due to a higher alpha coefficient when left out, resulting in a reliability of $\alpha = .733$ for obstacle-appraisal and $\alpha = .800$ for challenge-appraisal, respectively.

RESULTS

Descriptive statistics, correlation and reliabilities (Cronbach's alphas) are presented in Table 1.

TABLE 1. Descriptive statistics, reliabilities and zero-order correlations ab

	Mean	SD	1	2	3	4	5	6
1. Self Leadership	99.97	11.24	(.805)					
2. Optimism	40.69	3.91	.313**	(.789)				
3. Self Efficacy	21.09	2.42	.354**	.505**	(.824)			
4. Subjective Vitality	39.44	5.88	.379**	.584**	.470**	(.704)		
5. Challenge Appraisal	34.36	7.51	.112	-0.52	.084	-.032	(.800)	
6. Obstacle Appraisal	25.27	6.91	-0.03	-.245**	-0.1	-.202*	.222**	(.733)

Notes. N=146; ** Significant at .01 level; * Significant at .05 level; a. Cronbach's alpha reported on the diagonal; b. 5-and 7-point scales.

We tested all hypotheses using the final sample (N=146). In order to investigate the direct and indirect effects of the hypotheses, we performed a bootstrapping analysis (SPSS macro, model 4; Hayes, 2012). Bootstrapping analysis was used because it avoids statistical power problems that come from asymmetric sampling distribution and is more suitable for smaller samples (MacKinnon, Lockwood & Williams, 2004; Preacher, Rucker & Hayes, 2007). Direct effects of self-leadership and the venture founding date on the mediators are presented in Table 2.

TABLE 2. Bootstrapping analysis - optimism, self-efficacy, subjective-vitality (Mediators)

Predictors	Optimism					Self-Efficacy					Subjective Vitality				
	B	SE	t	LLCI	ULCI	B	SE	t	LLCI	ULCI	B	SE	t	LLCI	ULCI
Self-Leadership	.22	.05	3.9**	.1075	.326	.36	.07	4.60**	.2091	.5239	.49	.10	4.83**	.2949	.7039
Venture founding date	-.01	.02	-0.97	-.0479	.0164	.01	.02	.255	-.0402	.0522	.01	.03	.18	-.544	.656

Notes: * p < .05; ** p < .01; LLCI = Lower level confidence interval; ULCI = Upper level confidence interval.

Indirect effects of self-leadership and the venture founding date on challenge and obstacle appraisal via the mediators are displayed in Table 3.

Concerning hypotheses 1 to 3, as expected, results revealed a significant direct relationship between self-leadership and the mediators optimism (B = .22, CI [.1075, .3246]), self-efficacy (B = .36, CI [.2091, .5239]) as well as subjective vitality (B = .49, CI [.2949, .7039]). Resulting

in confirming hypotheses 1 to 3. We also controlled for the founding date in case the appraisal changes as the venture develops. However, no relationship was found between the venture founding date and either of the mediators.

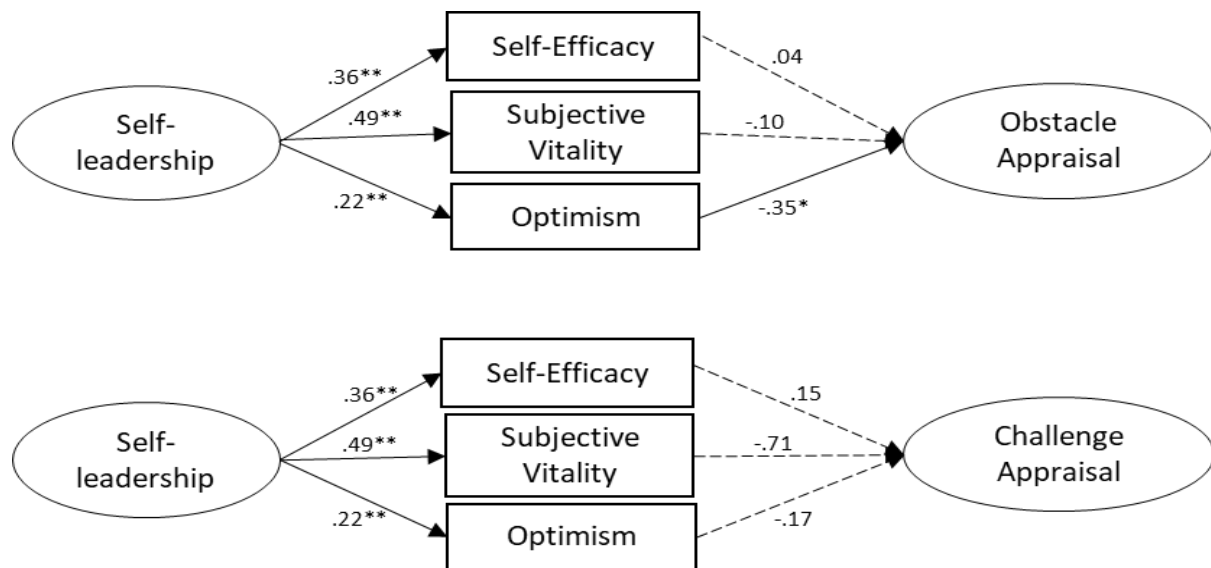
Hypotheses 4 and 5 referred to the indirect effect of self-leadership and stress-appraisal (challenge vs. obstacle) via the mediators a) optimism, b) self-efficacy and c) subjective vitality. Results from the bootstrapping procedure that are presented in Table 3, revealed that optimism has a negative effect on challenge-appraisal ($B = -.17$, CI $[-.5389, .3246]$). The same applies for the effect of subjective vitality on challenge-appraisal ($B = -.71$, CI $[-.5389, .3246]$). There is a positive effect from self-efficacy on challenge appraisal ($B = .15$, CI $[-.0869, .3738]$) that, however, is not significant. Conclusively, Hypothesis 4 was rejected. Concerning hypothesis 5, a positive effect of self-efficacy on obstacle-appraisal was detected ($B = .04$, CI $[-.1654, .2536]$) and a negative effect of optimism ($B = -.35$, CI $[-.6806, -.0186]$) as well as subjective vitality ($B = -.10$, CI $[-.2723, .0757]$) was found. Yet, only the negative effect of optimism on obstacle-appraisal was significant, resulting in confirming hypothesis 5a and rejecting hypotheses 5 b and c.

TABLE 3. *Bootstrapping analysis - Challenge and Obstacle-Appraisal (Outcomes)*

Predictors	Challenge Appraisal					Obstacle Appraisal				
	B	SE	t	LLCI	ULCI	B	SE	t	LLCI	ULCI
Self-Leadership	.16	.11	1.47	-.0549	.3777	.07	.09	.75	-.1216	.2700
Venture founding date	.03	.03	.99	-.0288	.0865	-.01	.02	-.51	-.0657	.0389
Mediators										
Optimism	-.17	.18	-.94	-.5389	.3777	-.35	.17	-2.09*	-.6806	-.0186
Self-Efficacy	.15	.12	1.24	-.0869	.3783	.04	.11	.42	-.1654	.2536
Subjective Vitality	-.71	.10	-.74	-.2613	.1187	-.10	.09	-1.12	-.2723	.0757

Notes: * $p < .05$; ** $p < .01$; LLCI = Lower level confidence interval; ULCI = Upper level confidence interval.

FIGURE 2. Final empirical model.



Notes: * $p < .05$; ** $p < .01$

DISCUSSION

Despite of the fact that the harmful effects of stress on one's mental health and well-being are very well documented and entrepreneurs are known as being exposed to a highly stressful environment due to uncertainty and scarce resources, little research has been dedicated to mechanisms that amplify the positive effects of entrepreneurship and mitigate the negative effects that are mostly linked to stress (Cooper & Marshall, 1976; McMullen & Shepherd, 2006; Shepherd, 2015; Shir et al., 2018). This is also because a lack in a more sophisticated approach of cross-level modelling can be observed (Hmieleski & Ensley, 2007). Literature therefore suggested to import concepts from different field such as organizational behaviour and strategic management (to take advantage of research that has already looked at stress in a various jobs). This is why in the aim of this study was: (1) importing the concept of self-leadership and looking at its indirect effects on the appraisal of stress via optimism, self-efficacy and subjective vitality; and (2) investigating if self-leadership, applied by entrepreneurs, leads to a more challenge appraisal, instead of an obstacle-appraisal, given the fact that the cognitive appraisal process of human beings plays a pivotal role influencing their well-being and functioning as critical

mediator of stressful person-environment relations (Lazarus & Folkman, 1984). The main idea is that people that guide themselves, are more likely to see stressors as challenges and self-leadership via optimism, self-efficacy and vitality helps them to create this kind of appraisal.

In accordance with previous research on the relationship between self-leadership and its effect on the perceived level of optimism and self-efficacy of individuals (e.g. St. Jean & Mathieu, 2015; Dolbier, Soderstrom & Steinhardt, 2001) our results revealed that self-leadership has a positive relationship with both, optimism and self-efficacy. The relationship between self-leadership and subjective vitality, however, has never been focus of research. Our results also indicate a positive relationship between self-leading and an individual's subjective vitality. Nonetheless, the indirect relationship between self-leadership and a more challenge-appraisal of stressors via the aforementioned attributes was not found. Concurrently, a negative relationship between optimism and obstacle-appraisal was measured, indicating that self-leadership, through the mediating effect of optimism, mitigates the obstacle-appraisal of stressors in entrepreneurs. No such mitigating effect came up through the mediators self-efficacy and subjective vitality.

Theoretical Implications

Firstly, the study contributes to research that has already been done on self-leadership and its positive relationship with optimism, self-efficacy and even subjective vitality. Given the fact that the research that was conducted previously mostly used students as their sample (e.g. Dolbier, Soderstrom & Steinhardt, 2001; St. Jean & Mathieu, 2015) our findings add evidence that the same relationship applies to “real” entrepreneurs with experience in the venture-creation-process. Especially, the positive relationship between self-leadership and subjective vitality contributes to the existing entrepreneurial literature, since the dynamic nature as well as the positive effects on enthusiasm and well-being, do open a new direction for further research on entrepreneurship (Ryan & Fredrick, 1997).

Secondly, findings on literature concerning the effects of stress-appraisal can be extended, as a result of our study that revealed one possible way of how individuals can create or influence these appraisals, especially important in an entrepreneurial environment (Baron, 1998). Studies on other areas such as hope (e.g. Chang & DeSimone, 2001) proofed its' influence on appraisal and coping and concluded that hope had a significant influence on the stress-appraisal of individuals. Our model examined the influence of self-leadership on other components of the positive psychological capital (optimism and self-efficacy), because there is evidence that PsyCap can be developed (Luthans, 2012). Further, we looked at the effects of self-leadership on the perceived subjective vitality of individuals, since past research validated its association to a better coping with stress (Tummers et. al., 2018). Although our findings did not support the hypothesis that self-leadership promotes the challenge-appraisal of stressors, the negative relationship on obstacle-appraisal via optimism opens a new avenue in research.

Practical Implications

The results of the study also have practical insights, that are especially relevant for the upcoming Gen Z, as it is known to become the most entrepreneurial generation that ever lived (Singh, 2014). At the same time, mentors and investors that regularly deal with entrepreneurs can benefit from the findings and help them in achieving their goals. Our findings contribute to a better comprehension as well as direction for entrepreneurial endeavours in the beginning stage of every venture-creation process by executing self-leadership and accordingly influencing one's optimism, self-efficacy and subjective vitality. By doing that, the positive conjunction between the components of the positive psychological capital together with subjective vitality and self-direction, self-motivation, a positive feeling of aliveness, more energy, better psychological health and an overall raise in well-being, can be achieved. This will help entrepreneurs in the most fragile phase of any start-up, by guiding them along self-

leading strategies to counteract feelings of loneliness, doubt and exhaustion (McMullen & Shepherd, 2006).

Furthermore, the role of stress-appraisal is important as the difference of perceiving stressors as challenges or as obstacles differs between individuals and affects entrepreneurial persistence in dealing with inevitable constraints that are part of the process (López et. al., 2018). Especially, the negative relationship between optimism and hindrance-appraisal of stressors is relevant. Considering that entrepreneurs can implement specific strategies and cues into their daily life which enhance their feeling that something good is happening in the future and ultimately reduce their view on stressors as limiting their entrepreneurial endeavours, can enhance their commitment, passion and motivation. Benefits also exist for educators and universities that offer entrepreneurship classes for their students. We advise them to put an emphasis on self-leading strategies and help students to apply them in order to provide a guideline of behaviors they can carry out while starting their own venture.

Strengths and limitations

The choice of sample was purposeful and beneficial to reflect the degree of self-leadership, optimism, self-efficacy, subjective vitality and stress-appraisal of entrepreneurs, since it exclusively consists of start-up founders. Compared to other studies, that mostly used students in entrepreneurship classes (e.g. St. Jean & Mathieu, 2015), participants of this study all have a business that is still operating, thus combining the knowledge and the experience that go together with the issues as well as the phases of high pressure, stress and uncertainty, all characteristics of entrepreneurship (Schindehutte, Morris & Allen, 2006). Nevertheless, people that might had a business idea but did not follow it further due to their inability to deal with obstacles for instance, are not reflected. Involving them in future researches and observe the changes in stress-appraisal through more self-leadership in a longer period of time, could provide a differentiated perspective on the very-early stages, and reveal if self-leading

ultimately leads to a more beneficial appraisal of stress when being implemented into the daily life of an entrepreneur.

There are some limitations that go along with this study, that may open avenues for future research. The ultimate goal was to find mechanisms that help entrepreneurs in their way of building a start-up and to find an antidote to the struggles and problems that have a negative impact on their health and well-being, ultimately resulting in failure. An attempt has been made in following Hmielseski and Ensley's advice and come up with a cross-level model, importing concepts from organizational behavior and strategic management (Hmieleski & Ensley, 2007). However, this approach is accompanied by limitations, that must be avoided in future research.

First, environmental characteristics like cultural differences do exist and should be taken into account when making a research on stress-appraisal. Hofstede's (2001) cultural dimensions theory for example, suggests that "uncertainty avoidance" consists of three components, one of them being stress (Hofstede, 2001, p.148). Therefore, the degree of how an individual appraises stress is highly connected to the cultural values of the country a person is from. That is why further research should integrate the role of cultural values, differentiating between countries with varying degrees of uncertainty avoidance, that lead to variations in stress-appraisal.

Second, the sample size of the study (N=146) may be considered small, which reduces statistical power and aggravates the detection of effects (Aguinis & Harden, 2009). Future studies should retest our hypotheses with a larger sample of entrepreneurs, especially including entrepreneurs that are at different phases in the venture creation process to inspect if there is an influence of the start-up survival on the level of optimism.

Third, our study used measures of self-report that can result in an overestimation of the relationship between the variables (Podsakoff, MacKenzie & Podsakoff, 2012). Especially internal states like optimism and vitality as well as the assessment of an individual leading oneself, fluctuate over time and are difficult to assess in a different way than self-reports

(Spector, 2016). In order to reduce the method variance, the assessment should take place in different moments, over a longer period of time.

Lastly, we tried to collect data of the firm's financials (mostly funding received through Seed and Series A rounds) to strengthen our conclusion and further make the link between stress-appraisal and investments that were gathered. However, data of only 72 start-ups could be detected on CrunchBase, which was too small for a sample size in order to get statistically significant outcomes. When conducting a similar study, start-ups should be chosen that got funded by investors and appear on the website, so that link can be achieved to derive a conclusion.

Future research

Future research should investigate further into the concept of self-leadership since it has been proven that its behaviors matter for entrepreneurs. Self-leadership in particular, consists of certain strategies that lead to a perception of control and a positive effect on performance outcome, which is especially important in the venture creation process. Also, the reduction of perceiving stressors as obstacles via optimism proposes a direction in which researches can navigate in order to fill the gap of an "hands-on approach" for entrepreneurs. Self-leadership is not important on how founders look at the challenge appraisal of stressors but is negative related to the hindrance-appraisal which opens avenues for further research. What causes entrepreneurs to see stressors as challenges rather than obstacles and what might the negative correlation between optimism, subjective vitality and obstacle appraisal lead to?

More studies should also focus on other sources that promote optimism, self-efficacy and vitality and how entrepreneurs might influence those attributes through their actions. This can be done by importing and integrating concepts that have the potential to support entrepreneurs along their journey.

CONCLUSION

Our goal was to find ways that amplify the positive effects of entrepreneurship and mitigate the problems that go along with it. By proposing that entrepreneurs who self-lead themselves do see stressors more as challenges rather than obstacles, we intended to find strategies that help entrepreneurs, especially in the beginning stages of the venture-creation process, when integrating those strategies into their daily life. Our results suggest that self-leadership can reduce obstacle-appraisal through optimism, which helps entrepreneurs in their efforts to build a start-up and deal with the demanding and uncertain process that is associated to it.

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